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CHOLESTEROL AND BASAL METABOLISM*

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As we view the study of cholesterol determination and basal metabolism, we realize that this presentation may serve one of two purposes. Either it will confuse us completely or show what quantities of data would be needed for any rationalizing of the subject.

The material in this paper is presented from the routine tests for basal metabolism from 1937 through 1946, and cholesterol determinations for the same ten year period. The latter tests increased in number from 1 in 1937 to 914 in 1946, the total being 2385. Basal metabolisms totalled 2708, averaging about 270 for each year. The swing towards a larger volume of cholesterol determinations came during the war years, when the elements of time and number of technologists were matched against the ever increasing demands for laboratory tests. The cholesterol determination could be used as an aid in the diagnosis of thyroid disturbances and did not require as much of the patients' time or the preparation by the patient before the test as did metabolisms.

The basal metabolism machines were the McKesson Metabolor, used since 1929, and the McKesson Waterless Metabolar, in use since 1942. (The procedures were done by the trained personnel of the laboratory under the supervision and direction of the clinical pathologist). Bloor's method for cholesterol determination was followed until 1942, when the shortage of chemicals encouraged us to use Sacketts' modification of Bloor's method. As you remember, Bloor uses 100 c.c. of 95% alcohol-ether mixture and 3 c.c. of plasma or serum, while in Sackett's modification 12 c.c. of the alcohol-ether mixture and 0.2 cc. of serum are

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needed. The two methods were checked against each other and were in agreement when we started to use Sackett's method.

The basal metabolic rate is the expression of the heat production of the body under conditions in which the energy of the body is at a low level; i.e. the individual is fasting, and is physically and mentally relaxed. If a genuinely basal condition is secured, then the rate is a measure of the activity of the thyroid gland as the heat regulator of the human body. It is known that an increased basal metabolic rate indicates an overactive thyroid, while a low basal metabolism shows deficient thyroid activity. The first condition is known as hyperthyroidism, and the second, hypothyroidism, or even myxedema. These results are the ideals of basal metabolic tests.

Basal metabolism tests are of value in giving clinicians help in diagnosis and treatment of disease. It is true that the basal metabolism test is not always a reliable guide to the degree of thyroid disturbance, and a slavish adherence to the results of tests may lead to error. There are many factors to cause errors in the tests themselves; but if used along with judgment of clinical symptoms, they will aid the doctor in making diagnosis and prescribing treatment.

Of cholesterol, it may be said that little is known, except that it is concerned with absorption and metabolism of fat. It is an alcohol and not a fat, being classified as a blood lipoid. It iccurs partly as free cholesterol (30-60%) and as cholesterol esters of fatty acids. The normal value of cholesterol in whole blood or serum varies from 150-200 mgms. per 100 c.c. It is said to be maintained at a constitutional level for each individual from which large deviations do not occur. Variations among different individuals cover a wide range, from 110-390 mgm. per 100 c.c. Of this about a third is free cholesterol, the rest being estrified. High values are found in chronic nephrosis, diabetes, biliary obstruction and hypothyroidism. In myxedema blood cholesterol is much increased, which is emphasized as of diagnostic importance. Low values are found in pernicious anemia and in hyperthyroidism.

In 1922, Epstein and Lande showed that serum cholesterol tends to vary inversely as the basal metabolic rate. Hurxthal claims that the cholesterol value has greater diagnostic importance than the basal metabolic rate as a criterion for thyroid activity. A cholesterol content below normal does not signify hyperthyroidism, nor does a normal exclude. But a cholesterol determination above the upper limits of normal rules out thyrotoxicosis, and a low cholesterol content is rare in myxedema. Cholesterol variations with regard to nephrosis, etc. have been ruled out in these considerations.

With these preliminary points before us, the paper deals now

with the material accumulated from laboratory tests. Of the basal metabolism tests 865, or 31.94%, were minus 10 or below; 1271 were within the minus 10 to plus 10 normal limits, a percentage of 46.93; and 572, or 21.13%, were plus 10 or more.

In 121 cases of the aforesaid tests, cholesterol determinations were made in addition to the basal metabolism tests; and 59, or 48.76%, did not show agreement as to high cholesterol and low metabolic rate, or vice versa, while 62, or 51.24%, showed comparative agreement. For example, three patients with normal basal metabolism readings gave cholesterol values of 185, 167 and 180 mgm. per 100 c.c. of blood; four with plus 5% basal metabolic rates were checked against 156, 188, 160, 198 mgm. cholesterol per 100 c.c. of blood; and four minus 9% readings for basal metabolism corresponded to 228, 245, 225, and 270 mgms. cholesterol per 100 c.c. of blood. These are a few of the sixty-two basal metabolic rates that showed agreement with cholesterol determinations.

You may rightly question the many factors which cause variation in these figures, but there is not time to review them here.

The purpose of this paper is to show you what material has been assembled in connection with the checking of basal metabolism tests against cholesterol determinations, and to present some of the facts concerning these two methods used in the diagnosis of thyroid activity as it is recognized from the measurement of metabolic processes.

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CHOLESTEROL DETERMINATION

(Sackett's modification of Bloor's method)

Put 9 c.c. ethyl alcohol in a 15 c.c. graduated centrifuge tube. Add 3 c.c. ether, and mix by inverting. Drop in slowly 0.2 c.c. whole blood or plasma. Add a pinch of Lloyd's alkaloid reagent (to remove interfering color). Cork tightly with a clean cork stopper and shake vigorously for about 1 minute. Let lie horizontally with the sediment evenly distributed along the tube for 30 minutes. Centrifuge rapidly for three minutes and decant supernatant fluid completely in a small beaker. Evaporate just to dryness on a water bath. Extract the cholesterol twice, for about 2 minutes each time, with small portions (2 to 2.5 c.c.) of chloroform and decant into a 10 c.c. graduated cylinder. Measure 5 c.c. of a standard cholesterol solution in chloroform (containing 0.4 mg. of cholesterol) into a similar 10 c.c. cylinder. To each of the solutions add 2 c.c. of acetil anhydride and 0.1 c.c. of concentrated sulphuric acid. Mix by inverting several times and then set away in the dark for 15 minutes. Transfer immediately to the cups of the colorimeter and compare as usual, setting the standard at 12 or 15 mm.

Calculations: $\frac{\text{Reading of Standard}}{\text{Reading of Unknown}} \times 200$ equals milligrams of cholesterol per 100 c.c. of whole blood.

Alcohol should be pure 95%. Ether should be of purity equal to that used for anesthesia. Chloroform should be kept over calcium chloride and filtered before use.

Stock standard contains 0.2 gm. cholesterol in 200 c.c. chloroform. Working standard is made by diluting 8 c.c. of stock standard to 100 c.c. with chloroform (5 c.c. contains 0.4 mg. cholesterol).

Practical Bacteriology, Blood Work and Animal Parasitology
By E. R. Stitt, A.B., Ph.G., M.D., Sc.D., LL.D
Eighth Edition, Revised and Enlarged.

CEREBROSPINAL FLUID PROTEIN*

By ALFRED H. HILL, M.D., *San Antonio, Texas*

Introduction:

The presence of fluid within and about the brain and cord has been known since the time of Galen. Cotugno in 1764 first adequately described this fluid. The publications of Mestrezat's Monograph in 1912 with his dialysate theory of its formation and Lange's colloidal gold reactions in the same year opened the modern era of knowledge of cerebrospinal fluid (1-6). As the result of observations on man by Cushing, Putman, Dandy and others, the formation of the fluid is known to take place principally through the choroid plexus in the lateral ventricles. (6, 7) The protein presumably comes from the blood plasma in a ratio of about 1 to 300. The manner of its traversing the layers of the choroid plexus is unknown. Merritt and Fremont-Smith (6) give a normal range of 15 to 45 and an average of 28 mgms. per cent in lumbar cerebrospinal fluid measured by the turbidity method of Denis-Ayer in their collection of over 5,000 fluids. The albumin-globulin ratio is approximately 5 to 1. Cisternal fluid drops to a range of 15 to 25 mgms. per cent and ventricular fluid to 5 to 15 mgms. per cent.

We are aware that disease both increases and changes the protein. The amazing values of 3,000 to 4,000 mgms. per cent appear in that interesting but obscure illness called polyneuritis with the Guillain-Barre albuminuric cytologic dissociation in the laboratory picture. This particular disease is being diagnosed with increasing frequency, but awaits your illumination as to etiology and then, perhaps, better therapy. On the other hand, in paresis you frequently find a normal protein, but colloidal gold curve gives evidence of marked change. Low values are present at the other extreme when forced drainage or any acute febrile illness in a child are encountered.

Experimental:

In 1942 and 1943—Kabat, Landow and Moore, (3, 4) reported from the Electrophoresis Laboratory at the Neurological Institute and Columbia Presbyterian Hospital in New York the results of their studies on cerebrospinal fluid protein. They helped to answer some of the questions as to the identity of protein

* Paper read at the convention Texas Society of Medical Technologists, San Antonio, April 1946.

fractions, relationship to plasma protein, and variations in the colloidal gold reaction.

Differently charged molecules and particles migrate at different rates in an electrical field and in a direction determined by the charge. Each electrophoretic movement separates like fractions from a heterogenous solution of proteins. Areas occupied by the various fractions are then measured optically and the percentage of each component computed. Relatively pure fractions may be removed for analysis from the final zones they occupy in the Tiselius electrophoretic cells.

TABLE I

Concentrations of protein components in cerebrospinal fluids and serums.

Case No.	DIAGNOSIS	PERCENTAGE						Tot. Pro.
		X	A	Alpha	Beta	Gamma	A/G	
1	Anxiety State	5.2	67.3	5.1	20.4	7.2	2.1	23
	Serum		61.0	8.5	16.4	14.1	1.6	
2	Lymphopathic Venereum		56.2		12.0	31.8	1.3	90
	Serum		39.6	8.4	17.7	34.3	.7	
3	Neurosyphilis		49.6	5.0	7.2	38.2	1.0	55
	Serum		60.7	12.3	22.1	11.0	1.6	

Table 1 shows parts of their results on comparative studies of electrophoretically separated fractions of sera cerebrospinal fluids from the same patients. It will be noted that the same rough percentage distribution of components is present in the pair of normal serum and spinal fluid. This is also true in the case of the grossly abnormal fluid and serum of lymphopathia venereum. In neurosyphilis, however, although the total cerebrospinal fluid protein is only slightly elevated, the gamma globulin is elevated out of proportion. We will return to that later. The X component is an unidentified occasional cerebrospinal fluid fraction with a faster electrophoretic mobility than albumin.

TABLE II

Concentrations of the protein components of normal and pathological cerebrospinal fluids.

Case No.	DIAGNOSIS	Total Pro. MGM Percent	MGM PERCENT (CALCULATED)					Colloidal Gold Curve
			A/G	A	Alpha	Beta	Gamma	
1	Post Traumatic Headache.....	30	1.5	18		7	4	1100000000
2	Multiple Sclerosis...	39	1.8	25		9	5	1100000000
3	Multiple Sclerosis...	40	0.8	18	2	6	13	2222100000
4	Multiple Sclerosis...	110	3.0	81	6	10	11	1100000000
5	Neurosyphilis.....	70	0.8	30	3	7	30	1122100000
6	Neurosyphilis.....	92	0.8	40			52	5555544210
7	Poluneuritis.....	198	2.2	130	17	23	23	1100000000

After Kabat.

Table II illustrates certain findings in normal and pathological fluids. Alpha or euglobulin does not appear usually in normal cerebrospinal fluid, but does in those with elevated total protein. The three cases of multiple sclerosis demonstrate the fact, also evident in neurosyphilis, that significant colloidal gold changes are found in the presence of disproportionately elevated gamma globulin. Case II has a normal total protein, colloidal gold curve and gamma globulin, fraction. Case III, on the other hand, has a normal total protein, but a first zone rise in the gold curve and a gamma globulin fraction of 13/40ths or 33%. Case IV shows a quite high abnormal total protein, but a flat curve and normal gamma globulin percentage. The examples of neurosyphilis each show abnormal curves, very high gamma globulin fractions, and high total proteins. The marked first zone reaction fluid has the highest percentage of gamma globulin reported, 52/92nds or 56%. Polyneuritis presents a situation with very high total protein, but a normal curve and gamma globulin percentage.

TABLE III

Colloidal gold curves on electrophoretic fractions of concentrated spinal fluids.

Case No.	DIAGNOSIS	Original Unconcentrated Spinal Fluid	COLLOIDAL GOLD CURVES		
			Albumin	Middle	Gamma
1	Idiopathic Grand Mal	1100000000	0000000000	0000000000	1112210000
2	Post Traumatic Headache	1100000000	0000000000	0000000000	0000000000
3	Cirrhosis	1100000000	0000000000	1111222110	1243210000
4	Multiple sclerosis	2222100000	0000000000	3322221100	5553321000
5	Neurosyphilis	5555544210	0000000000	5554332110	5555432100
6	Neurosyphilis	1111122211	0000000000	1112221000	5554321000

After Kabat.

Table III shows the relationship of the colloidal gold activity to the composition of cerebrospinal fluid. Representative cases show the respective curves of the original fluid, the relatively pure separated albumins and gamma globulins and the partially separated mid-fractions. It is evident that the gamma globulin of normal fluid as in the epileptic does alter the curve, but the admixture of the albumin and other factors in the original fluid prevents this alteration. As we go on to the abnormal fluids, we find considerable curve activity when the generally increased proteins of cirrhosis are separated. The individual protein curves from the originally abnormal curves of multiple sclerosis and neurosyphilis in the last three cases indicate that the agent for curve abnormality resides in the globulin fraction and that the albumin of the natural admixture tends to obscure the change.

Discussion:

Kabat and his group have presented evidence, then, that the composition of protein in cerebrospinal fluid closely resembles that of serum. The fractions of protein in the cerebrospinal fluid

take part in the similar rise in abnormal sera. In cases with meningitis or vascular damage, transudation of protein may give high values of all the fractions found in blood. In certain illnesses, such as neurosyphilis and multiple sclerosis, however, the gamma fraction is selectively elevated. It is the gamma fraction as isolated by electrophoresis which is responsible for abnormalities of the colloidal gold curve. Changes in the curve at the right and may occur in the presence of normal globulin or generally increased protein. This is due to the loss of the inhibiting effect of albumin in the higher dilutions. At this point it is pertinent to recall the statistics on colloidal gold curves presented by Merritt and Fremont-Smith. (6) They found an incidence of 5% first zone abnormalities in over 5,000 fluids; 63% of these reactions were in the presence of central nervous system syphilis and 17% in multiple sclerosis. They report that such a change rarely occurs with normal total protein except in the presence of syphilis or multiple sclerosis. The mid and end zone changes, however, are regarded by them as quite non-specific.

The special significance of gamma globulin indicated here is consistent with certain other observations. Freund (2) showed that the distribution of antityphoid agglutinins between rabbit sera and spinal fluids bore a relationship of 300 to 1. This is the rough ratio, as well, of gamma globulin. Kabat (5) has shown that several human and rabbit antibodies have the same molecular weight as their respective gamma globulins. It is not very surprising then that both antibodies and gamma globulin show the same ratio of distribution since their molecular weights are the same and they would be expected to act similarly at the hemato-encephalic barrier.

The date herein presented suggests that some formation of gamma globulin occurs within the central nervous system in syphilis and to a lesser extent in multiple sclerosis. This probably indicated local antibody formation in lues and accounts for cases of negative blood Wassermanns in the presence of positive spinal fluids. With respect to multiple sclerosis the clinician says much laboratory work must be accomplished before understanding of this frequent and crippling disease approaches a comfortable level.

Conclusions:

1. Cerebrospinal fluid protein is commented on in general.
2. Pertinent electrophoretic studies are reviewed in more detail.
3. Polyneuritis and multiple sclerosis are suggested as unsolved problems of frequent and disabling illness in need of much laboratory study.

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"WILL O' THE WISP" IN THE LABORATORY*

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There is a peculiar protein substance which is present one minute and the next minute has vanished. This Bence-Jones protein, named after its discoverer, is a veritable "Will o' the Wisp." It is present in normal bone marrow in lymphocytes and other leucocytes where it seems to be manufactured, but whether it is a single protein or a class of substances possessing similar coagulation properties is still a moot question. It is endogenous in origin with a comparatively low molecular weight as compared to other proteins. There is a possibility that the amyloid substance found in amyloidosis and Bence-Jones protein are of similar origin. Amyloidosis has been found to develop in the later stages of multiple myeloma in which condition Bence-Jones protein is not an uncommon finding. Some authors believe this protein to be a result of deranged protein metabolism which would otherwise produce normal proteins; others believe it to be a proteose. Canterow and Trumper (3) are of the opinion that it is globulin in nature, while Wintrobe (10) believes that it is a highly unstable form of euglobulin. More studies must be made before any definite conclusions can be drawn.

Since the formation of Bence-Jones protein is greatly influenced by the leucocytes, it is not surprising that it has been found in the urine of individuals suffering from leukemia and even empyema. In general, it could be expected to be excreted in the urine whenever large numbers of white cells are destroyed or when bone marrow escapes into the circulation. As was stated above, it is present in normal bone marrow; therefore, one might expect to find it in the urine in osteogenic sarcoma, osteomalacia, carcinomatous metastases to the bone, and multiple myeloma. In the abdominal type of Hodgkin's disease where destructive lesions have developed in the bones, particularly those of the skull, Bence-Jones protein has been found in the urine. However, the condition is rare.

Bence-Jones proteinuria is apparently very uncommon, which seems to indicate that the body can either use or destroy much of the protein which gets into the circulation. The excess is excreted in the urine. Perhaps if the problem were studied further, it might be found that the condition is not so rare, but that a greater percentage of leukemic cases and other cases in which the red bone marrow is involved may show Bence-Jones proteinuria. It may be found in any condition in which the red bone marrow shows some pathologic process.

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* Read before A.S.M.T. Convention, Denver, Colo., 1947.

This protein is not pathognomonic for multiple myeloma, although that is the condition in which it is most commonly found in the urine. Sixty to eighty per cent of the cases show Bence-Jones proteinuria late in the disease when it is also apt to occur in the blood and serous exudates. In a few instances it has been found to constitute the greater part of the serum protein. The precipitation of the protein has been noted when inactivating serum at 60° C. In the early stages of myeloma Bence-Jones protein is present in the urine intermittently, but quite constantly in the terminal stages. However, it is present at some stage of the disease. When hyperproteinemia is present, the protein is more likely to be absent from the urine, whereas, when the serum proteins are normal or low it is more apt to be present in the urine. (10) It may constitute almost the total urinary protein, or as is more often the case, it may be accompanied by albumin or globulin or both. Bannick and Greene advise that the urine of all individuals "showing marked proteinuria with marked secondary anemia, blood nitrogen retention, and delayed phenolsulphonaphthalein excretion with little or no edema, hematuria, hypertension, or retinitis" should be examined for Bence-Jones protein. (6) It easily escapes detection in routine examinations, especially when associated with albuminuria which is very frequently the case in the leukemias and multiple myeloma.

Chemically and immunologically the protein is different from all other serum proteins in that it does not give the precipitin reactions that the other proteins do. It precipitates from solution at a relatively low temperature (50° C.-60° C.) and disappears wholly or partially upon boiling, but reappears on cooling. Therefore, the condition has been termed "thermolytic albuminuria." In the light of the preceding paragraphs a more appropriate term would be "thermolytic proteinuria."

It must be differentiated from mucin which may appear in the urine as a result of irritation of the urinary tract. It must also be distinguished from proteoses which likewise disappear on boiling and reappear on cooling. Mucin can be removed by precipitating it with nitric acid and filtering the urine while hot. Proteoses are precipitated with trichloracetic acid, phosphotungstic acid, and sulfosalicylic acid; they may also be separated by half-saturation and saturation with ammonium sulfate.

The concentration of salts and the reaction of the urine markedly influence the precipitation of the protein. Osgood and Haskins (8) have devised the following method for precipitation of Bence-Jones protein: To 5 cc. of urine add one part of 50% acetic acid and three parts of saturated sodium chloride solution (about 30%). A precipitate appearing at room temperature upon the addition of the acid suggests the presence of bile salts, resins, or

urates. A precipitate appearing at room temperature upon the addition of the salt suggests the presence of Bence-Jones protein. Proteoses do not precipitate at any temperature in this test. Neither the acid nor the salt alone will precipitate Bence-Jones protein. Decherd and Dickens from New Orleans after studying cases of renal disease using the salt and acetic acid test also, have come to the conclusion that precipitation with this method is not suggestive evidence of Bence-Jones protein, but that other proteins are precipitated also.

According to Bray (2) the protein should disappear on cooling below 50° C. However, Osgood and Haskins claim that this is not true, but that it remains precipitated even at lower temperatures.

CASE HISTORY

A 68 year old white female was admitted to the hospital on 12/8/46 complaining of soreness in legs, occasional headaches and dizzy spells. Past history revealed a cholecystectomy. Physical examination showed hypertrophic arthritis of the extremities. Her blood pressure was 120/80. Chest x-ray showed chronically increased lung markings with emphysema and calcified childhood tuberculosis. An x-ray of the abdomen showed calcification of the abdominal aorta and pelvic vessels. The I. V. pyelogram showed poorly functioning kidneys with no evidence of dye in either right or left kidney. Urinalysis findings were as follows: S.G. 1.014; RBCs 2-3 in one specimen but none in any of the subsequent specimens; WBCs 4-5; albumin 4 plus constantly; trace of sugar; total protein on a 24 hr. specimen 0.53 grams per cent. Urea nitrogen was 100mg%; creatinin 6.4 mg%; serum calcium 8mg%; total serum protein 6.8gms%; albumin 3.87gm%; globulin 2.51gms%; Urea clearance 4.5%; PSP test was less than 7%. An x-ray of the skull showed no evidence of bony pathology. Her hemoglobin on admission was 9.5 gms. but later dropped to 8.4 gms. Her blood pressure was never elevated during the course of her illness. She gradually went down hill until she expired on Dec. 31, 1946. Autopsy revealed an adrenal adenoma of the left kidney, amyloidosis, pulmonary edema, fibrous pleuritis, bronchopneumonia, chronic bronchitis, adhesive pericarditis rectal polyp, and deformities of fingers and toes. The skeletal system was not examined.

DISCUSSION

A urine specimen from this patient was received in the laboratory a few days after her admission with the request for a Bence-Jones protein test to be run on it. The urine was pale, clear, and alkaline. The Heller ring test showed a 4 plus albumin; the sulfosalicylic acid test also showed 4 plus albumin with a very heavy curdy precipitate which is suggestive of Bence-Jones protein. In

the heat and acetic acid test it was noted that a precipitate formed at 40° C. and was very definite at 60° C. As the urine was boiled the precipitate became more dense and remained after the addition of acetic acid. To obtain an albumin free filtrate the solution was filtered while hot. The filtrate came through clear, but a cloudiness developed as soon as the fluid came into contact with the cool tube. When the filtrate was boiled, the precipitate dissolved and reappeared on cooling to 80° C., reaching the maximum density at 60° C. To prove that the substance was a protein the biuret test was performed. The result was positive. The recommended acetic acid and salt test was carried out. No precipitate formed upon the addition of acid, but when the salt was added a very dense precipitate formed at room temperature. The Bence-Jones protein was again precipitated in an albumin-free filtrate with alcohol. The specimen was centrifuged and the precipitate thus collected was soluble in water.

An experiment was run on three samples of a subsequent specimen from the same patient, also on three samples of a bloody specimen from a case of nephritis, and on three samples of a specimen containing blood from an obstetric case.

I. The albumin was precipitated from the first sample of each specimen with sulfosalicylic acid. The specimen was boiled, filtered while hot and the filtrate tested for Bence-Jones protein in the usual manner. In the obstetric case, when the filtrate was cooled to 50° C. after boiling, a precipitate began to appear. However, when the test was run on the centrifuged specimen, the result was negative. The same was true of the test on the sample from the case of nephritis. In the first case, the precipitate in the filtrate formed after boiling as the urine cooled to 80° C. At 60° C. the precipitate was very dense, so much so that it began settling to the bottom.

II. Each specimen was then tested with the Heller ring test, using concentrated nitric acid to precipitate the albumin, boiled and filtered while hot. The filtrate was then tested as above for Bence-Jones protein. The first case was positive as before while the other two were negative.

III. Again each specimen was boiled without any preliminary precipitation of albumin. After a few minutes of boiling acetic acid was added to insure complete precipitation of albumin and other proteins, and the solution was filtered while hot. Again the filtrate was tested for protein. The two cases which were previously negative remained negative, while the other was again positive.

Conclusions:

1. That albumin must be completely precipitated.

2. That this may be done by any standard method without interfering with the test for Bence-Jones.
3. That blood interferes when sulfosalicylic acid is the protein precipitant.

General Conclusions:

1. That greater study must be devoted to the problem before a definite conclusion can be drawn as to the nature of Bence-Jones protein.
2. That Bence-Jones protein may appear in the urine in amyloyd disease.

I wish to thank Sister M. Arlene, Doctor Knoll and Doctor Bartness for their kind assistance and encouragement.

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TRENDS IN LABORATORY SERVICE IN HOSPITAL PRACTICE*

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Clinical pathology and pathologic anatomy have grown in hospital practice in measures far beyond anything thought probable twenty-five years ago. In fact, before World War I, only the large hospitals had given thought to clinical laboratory facilities as an organized unit, and few indeed were the laboratories of such hospitals that had even the part-time services of a pathologist. Many of these part-time pathologists were engaged in developing their private practice—the larger interest—and serving the laboratory was a more-or-less temporary medium of subsistence.

The clinical laboratory examinations at that time were limited mainly to blood counts, hemoglobin estimations, differential counts, urine analyses, stool examinations for blood and parasites, some form of the Wassermann test of serums and spinal fluids, and a limited amount of bacteriology. Methods for chemical analyses of the blood were unknown or just beginning to be developed. Estimates of the urea content of the blood were the first. The colorimetric methods for blood analysis devised by Folin shortly thereafter (1919) opened the way for routine chemical analysis of the sugar and non-protein nitrogen substances of the blood in addition to the urea content. Refinements of these methods and additions have brought the methods of blood analysis to the present level.

The practice of anatomic pathology including the examination of a modicum of surgical tissues—mainly the ones that puzzled the surgeons—was restricted to the pathology departments of the medical schools and an autopsy outside of these circles was done by the doctor himself using the "grab and cut" system, or some one of the pathology department of a medical school was cajoled into making a postmortem examination by baiting him with the idea that he would have a wonderful new experience although the main purpose, not revealed by the attending physician, was his curiosity to know what actually was wrong with the patient. These conditions have changed and with the practice of medicine moving into higher levels and being extended more widely into communities, clinicians more and more depend upon the results of laboratory procedures in the diagnosis and the guidance of treatment of their patients. The present generation of surgeons is becoming so imbued with the need of routine tissue and biopsy

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examinations by trained pathologists that the omission or restriction of such a service calls forth a strong protest. Hospitals, especially those with teaching programs are now reporting high percentages of autopsies on deceased patients.

The patient load of hospitals which today is at its peak in all communities is reflected in the demand for examinations by the laboratory. Observing over many years in graph curves the rising volume of laboratory examinations at St. Luke's Hospital I have wondered when a saturation level would be reached and when would the curve rising year by year, more abruptly in some years than in others, level off and become more or less flat. I have not seen any indication of such a trend and every new procedure or examination simply increases the total volume.

The means of meeting these trends in hospital practice include physical organization, personnel, equipment, and the integration of the laboratory into the total machinery of the hospital. If the pathologist can have some part in planning the floor space of the laboratory or is given ample opportunity to express himself in the revision of constructed space into laboratory purposes, he would do well to think in larger terms than his first ideas indicate. I condition this remark for the reason that usually the architect of the hospital speaks, so to say, for all, and his thinking under pressure from other groups contracts the allotted laboratory space and may even place it somewhere inaccessible or at a disadvantage from the standpoint of efficient operation in the institution. Instead of being thought of in terms of first importance in a hospital, the laboratory is rated at a level below bed space, administration, etc. This form of planning in hospital construction either belittles the thinking quality of the attending staff and holds it to a level where skimpy laboratory service is considered sufficient, or it sets a low level of expected medical practice in such a hospital and with dogmatic finality implies that this is the form of diagnosis, treatment and care which patients of that institution should have.

To cover the large demands for laboratory services the work should be distributed into various departments such as hematology, urinalysis, stomach analysis, bacteriology, serology, blood chemistry, tissue sectioning, parasitology, blood bank, etc. Where control is possible the physical arrangements of these departments should be segregated into separate small rooms rather than collected in a large room with multiple activities and attendant confusion. Hematology, with its special equipment, is obviously different from the other departments, and each of the other departments has specific requirements as regards physical arrangement and equipment. The size and organization of the personnel in these departments is determined by the volume of

work. Where personnel requirements permit, each department is in charge of a technologist with special training and ability to assume full responsibility with guidance. The further personnel requirements are determined by the work volume. Such a plan of organization covers the work requirements and provides a teaching framework for training other technologists under close supervision. The integration of the laboratory functions into those of the hospital, and specifically to the medical care of the individual patient may be complex, especially when a large number of diagnostic procedures are requested during a minimal stay of the patient in the hospital. These are usually specific problems and their solution depends upon an analysis of the conflicting elements, and they frequently can be adjusted.

Within recent years the photometric estimation of color concentration has changed the methods and increased the accuracy of many of the procedures now used in chemical examinations of the blood. Hemoglobin concentrations were among the first to be determined by this method, but analyses of other blood constituents have followed. Many of the instruments use filters at characteristic wave lengths, others are made with prisms and calibrated for the entire range of colors in the spectrum. The preparation of graphs and charts for analyses by these instruments has disclosed instabilities in the colors developed which made necessary further studies into temperature and light conditions, reagents, time elapsing between the mixing of the reagents and the reading of the color value. This was found true especially for the cholesterol determinations and all sorts of variations occurred until the factors of time elapsing, temperature and the exclusion of light were controlled. The system of photometric analysis has naturally eliminated the use of the ordinary colorimeter and new methods with this instrument have shortened considerably some of the old standard methods, notably the urease method for urea determination and the plasma proteins of the blood. Other analyses as with hepatic disease, which were not possible with the ordinary colorimeter are now made by photometric analysis. It seems to me that probably many more examinations in the field of blood chemistry will be devised for the photometer.

Cleaning solution made with concentrated sulphuric acid and bichromate salts has for years been used as the detergent and oxidizing agent in laboratories. Think of the many gowns, and other articles of wearing apparel that have been destroyed. I even have memory of a young woman jumping into a large sink and turning on the water taps in order to save herself from serious burns, to say nothing of her clothes that were destroyed. Had she not been so nimble she might have been an Eve, but not in a Garden of Eden. Think also of the desk tops, the sinks and plumb-

ing, most of which is out of sight—and mind—that bear the marks of this corrosive agent. It may be shocking to say to you that simple detergents have been devised which do all that our famous cleaning mixture does and without the associated hazards. Save yourself work and valuable time with an automatic glassware washer such as a pipette washer—it pays good dividends and with a little ingenuity can be "home-made" if necessary.

Still one of the big drudgery chores in tissue work is the honing and stropping of the microtome knives. Now electrically driven machines are being offered that do the job in a fractional part of the time necessary with the old method and with greater ease.

The use of whole blood and blood plasma in simple therapy, emergencies as with shock and hemorrhage, and to support a patient during a long surgical operation has become so common a practice that all large hospitals have made provisions for meeting this need. The laboratory is usually called upon to organize and develop these facilities and there are many problems connected therewith. The sterile precautions necessary in collection and preservation of the blood and plasms, the care in compatability and other serologic tests, the processing of the equipment needed to give the transfusion and all of the details of procedure necessary to deliver safe blood to the proper recipient become accordingly the responsibilities of the laboratory.

The laboratory engages in many activities that are not strictly in the performance of clinical tests. They may be considered in the general theme of teaching. This may be in providing instruction for technologists or for physicians who need a period of training in morgue and surgical pathology for their specialty and for others who wish to specialize in clinical pathology and pathologic anatomy. These are functions that can be developed only at the higher levels of laboratory organization and with sufficient material for training purposes. Dealing more specifically with the professional group means adequate surgical and autopsy tissues. The routine gross and microscopic examination of the surgical tissues can be organized in conference groups with young physicians, under close supervision by the pathologist. The same applies to the postmortem examinations where under close supervision the trainees are given the routine procedures for a complete necropsy, the preparation of the record, anatomic diagnosis and clinical brief, and subsequently a record of the histologic study of the sections.

Integrated into these activities are those concerned with presenting autopsy material in clinical pathological conferences for the resident and attending staff of the hospital. At St. Luke's Hospital through trial, organization, and recognizing the full value of the fundamental principles of visual education in large

group discussions, the presentation of material in the clinical-pathological conferences is accomplished by projection on a large screen. This is done with three projectors, an opaque object projector, a lantern slide projector and a micro projector for histological preparations. The clinical brief is flashed on the screen and at the same time it is read to the group by a resident. This is followed by supplemental comments and corrections by the resident and attending physician. The pathologist then gives the essentials of the anatomic diagnosis, also projected on the screen, and reviews on the screen the tissues of the autopsy, giving at the same time a running account of the conditions disclosed by the necropsy. This review is supplemented by Kodachrome slides of the essential tissues and a projection of the histology. A summarizing statement by the pathologist closes his remarks and a general discussion by the attendant members of the staff and visitors follows.

The tissue details and color brilliance of the Kodachrome slides arouse much interest and enthusiasm in these conferences. After groping with the small sized films, and various ways to avoid highlights in the photographs, we decided to use the 3¼ by 4 professional Type B cut film. This larger size lends itself to displays in viewing boxes without magnification and also to filing in systems in photographic museum collections. The tissues to be photographed are blocked out during the postmortem examination or prepared if in surgical material, fixed to retain natural color and then photographed with a special illuminated box. These activities indicate to you that a well developed photographic department is an integral factor in such teaching activities for preparing the Kodachrome slides, making negatives for black and white prints, and for photomicrography. We accordingly have been able to develop a photographic museum with prints and lantern slide material for the use of the entire staff, and catalogued like a loan collection.

Activities such as this increase the value of the laboratory to the hospital and develop a sense of helpful cooperation and good will among the resident and attending staff.

These are some of the trends in the laboratory service in hospital practice. I have not mentioned research activities which, of course, are part of such an organization, whether it be large or small. This spirit of investigation develops a curiousity to know more, it spreads like a leaven into the routine, and gives zest to the general morale of the laboratory pesonnel. I think of the laboratory as being constantly in a flux, never static, and continually working to improve itself and the practice of medicine.

HYPOGLYCEMIC STATES*

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That hypoglycemia presents itself as a diagnostic and therapeutic problem is readily understood when one considers the complex mechanism involved in maintaining the blood sugar within normal ranges.

The healthy individual maintains a blood sugar between 70 to 110 mgm. per cent in the postabsorptive condition. Blood sugar levels below 70 mgm. per cent are recognized as hypoglycemia, but symptoms of hypoglycemia do not usually become prominent until the level falls below 60 mgm. per cent. On the other hand, after a meal, the blood sugar rises rapidly to about 180 mgm. per cent or less, and then falls as the blood sugar regulatory system is brought into play.

This delicate mechanism which provides a defense against abnormal variations in the blood sugar level may be illustrated by the following diagram (Fig. 1).

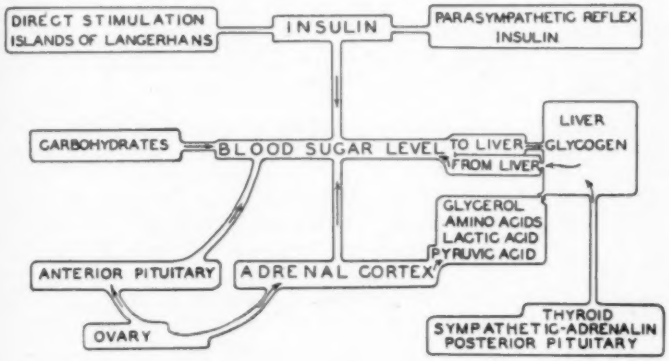

FIG. 1 BLOOD SUGAR CONTROL MECHANISM

After ingestion of a meal, hyperglycemia is prevented during the absorptive phase by the rapid conversion of glucose to glycogen and by the production of insulin, both through direct stimulation of the Islands of Langerhans, and through the nervous

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reflexes arising in the parasympathetic centers of the hypothalmus and medulla oblongata.[1]

Hypoglycemia is prevented during and after the absorptive phase by a more delicate and complicated mechanism. Whenever the blood sugar drops to hypoglycemic levels, the sympathetic-adrenalin system is provoked into action.[2] This release of adrenalin along with the activity of the thyroid[3] and posterior pituitary glands[4] mobilizes liver glycogen, and hastens its release into the blood stream as glucose. In addition to these factors, the anterior pituitary[5] and adrenal cortex[6] counteract hypoglycemia by decreasing oxidation of carbohydrates in tissues.

This mechanism is well illustrated in an analysis of the normal glucose tolerance curve (Fig. II). Glucose administered to normal individuals in the fasting state shows a rapid rise in the blood sugar level, which reaches a peak in about thirty (30) minutes This hyperglycemia stimulates the parasympathetic-insulin sys-

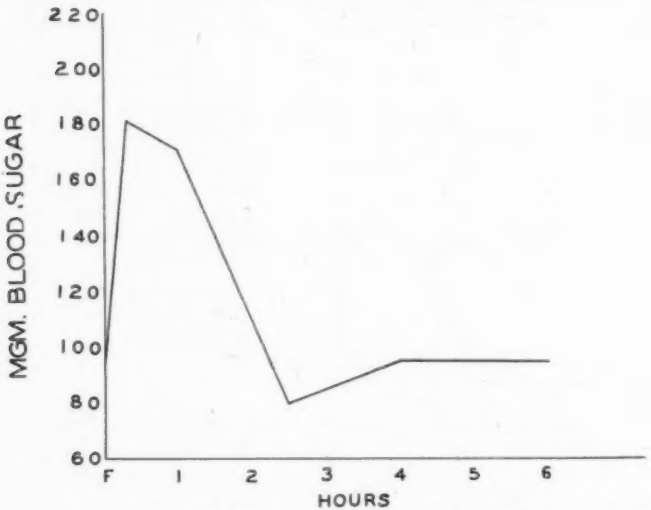

FIG2NORMAL GLUCOSE TOLERANCE CURVE

tem into action to combat the high blood sugar level. In addition, the instrinsic function of the liver aids in decreasing the blood sugar by the conversion of glucose to liver glycogen. The blood sugar is thus reduced until it reaches normal levels in about two and one-half (2½) hours. The insulin system continues to act

after absorption has been completed, and as a result the blood sugar may fall to hypoglycemic levels. If it falls below the fasting level, the sympathetic-adrenalin apparatus is stimulated and hepatic glucose is released into the blood stream to reestablish normal blood sugar levels.

Because of the complexity of this blood sugar control mechanism, it follows that a variety of conditions may give rise to disturbances in carbohydrate metabolism with resultant hypoglycemia.

Conn (7) has classified the spontaneous hypoglycemias as follows:

I. Organic—recognizable anatomic lesions.
   (A) Hyperinsulinism.
      1. Pancreatic island cell carcinoma.
      2. Pancreatic island cell adenoma.
      3. Generalized hypertrophy and hyperplasia of the Islands of Langerhans.
   (B) Hepatic disease.
      1. Ascending infectious cholangiolitis.
      2. Toxic hepatitis.
      3. Diffuse carcinomatosis.
      4. Fatty degenerations, fatty metamorphosis.
      5. Glycogenosis (Von Gierke's disease).
   (C) Pituitary hypofunction (anterior lobe).
      1. Destructive lesions (chromophobe tumors, cysts, etc.).
      2. Atrophy and degeneration (Simmonds' disease).
      3. Thyroid hypofunction (? secondary to pituitary hypofunction).
   (D) Adrenal hypofunction (cortex).
      1. Idiopathic cortical atrophy.
      2. Destructive infectious granulomas.
      3. Destructive neoplasms.
   (E) Central nervous system lesions (lesions of brain and brain stem, said to interfere with nervous control of blood sugar).

II. Functional—no recognizable anatomic lesion.
   (A) Hyperinsulinism (autonomic nervous system imbalance).
   (B) Renal glycosuria (severe degrees of low renal threshold for dextrose).
   (C) Severe continuous muscular work.
   (D) Pregnancy and lactation.

A survey of a group of patients at the University of Kansas Hospitals and Out-patient Department, who have had glucose tolerance tests during the past three (3) years, gives some inter-

NO CASES	DIAGNOSIS	GLUCOSE TOLERANCE TEST HOURS	1	2	3	4	5	6	7	8
117	PSYCHONEUROSIS		82	98	85	76	69	78	80	
45	EPILEPSY		80	103	89	71	69	73	76	75
14	PREGNANCY		79	114	93	78	64	77	65	
8	HEART DISEASE		71	93	88	74	60	64	65	
6	MALNUTRITION		82	100	94	69	75	79		
3	ADENOMA OF PANCREAS		34	136	155	125	86	59	38	41
2	RENAL GLYCOSURIA		79	101	91	73	67			
1	ADDISON'S DISEASE		73	149	95	59	55	64	77	
1	DIABETES INSIPIDUS		79	111	76	71	74	64	56	
1	PITUITARY DWARF		56	104	76	58	43	38	37	
1	ACROMEGALY		91	122	94	73	65	83	80	
1	FROHLICH'S SYN. CATARACTS		95	80	82	79	81	89		
1	THYRO-PIT. INSUF. "		79	112	71	61	69	73	73	
1	PICK'S PSEUDOCIRRHOSIS		83	73	59	83	83			
1	SPRUE		87	95	90	86	74	82	76	
1	LEUKEMIA MYELOGENOUS		40	71	89	91	100			
1	" ALEUKEMIC		84	103	87	93	71	53		
2	CELIAC DISEASE		71	94	98	79	74			
1	CHRONIC HEPATITIS		80	110	89	69	83	52	66	
1	WILSON'S DISEASE		87	122	99	100		81		
1	NARCOLEPSY		82	106	95	87	70	73	73	
1	HIRSUTISM		81	71	67	81	76			
1	SCHULLER HAND CHRISTAIN		76	116	109	50	59	07	53	
	TOTAL CASES 212									

CHART I

esting data in this respect. A total of eight hundred and fifty-two (852) tests were studied. In this group were found two hundred and twelve (212) cases that revealed a "flat" glucose tolerance curve. These two hundred and twelve (212) cases were composed of patients who had various diagnoses, as shown below:

117 psychoneurosis
45 epilepsy
14 pregnancy
6 malnutrition
8 heart disease
3 adenoma of pancreas
2 renal glycosuria
1 Addison's disease
1 hirsutism
1 Frohlich's Syndrome with cataracts
1 pituitary dwarf
1 thyro-pituitary insuff. with cataracts
1 diabetes insipidus
1 acromegaly
1 Pick's pseudocirrhosis
1 sprue
2 celiac disease
1 aleukemic leukemia
1 myelogenous leukemia
1 Wilson's disease
1 chronic hepatitis
1 narcolepsy
1 Schüller-Hand-Christian disease

Psychoneurosis Group:

The psychoneurosis group of one hundred and seventeen (117) patients represents the largest group. They exhibited a varied group of symptoms which occurred with the following frequency: weakness and fatigue 70%, headache 50%, faintness 48%, vertigo 42%, palpitation 36%, sweating 30%, tremor 13%, nausea 12%, hunger 9%, and visual disturbances 8%. Other symptoms such as insomnia, sleepiness, tenseness, and flushing were occasionally recorded. Lowered basal metabolism was the usual finding in this group.

The average glucose tolerance curve (oral glucose) of the one hundred and seventeen (117) cases of psychoneurosis is shown in Fig. III, Line A.

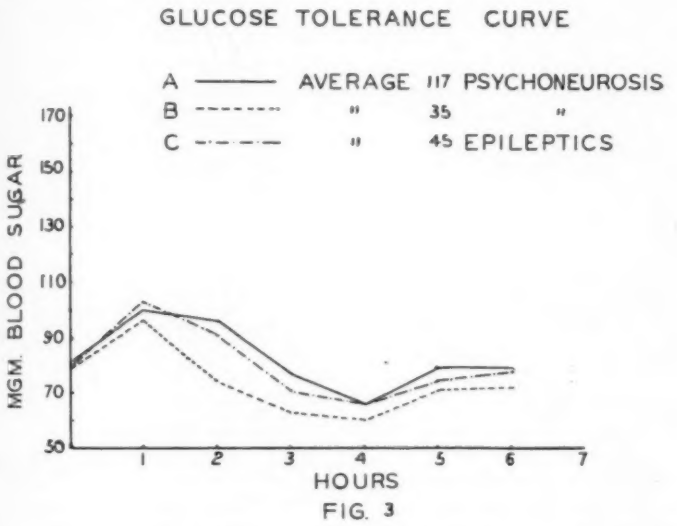

FIG. 3

Thirty-four (34) cases or thirty per cent (30%)of these cases of psychoneurosis revealed a blood sugar which fell below 60 mgm. per cent during the test. The average glucose tolerance curve for these thirty-four (34) cases is shown in Fig. III, Line B.

It will be noted that the curves in this group show a normal fasting blood sugar level, essentially flat response to glucose with a drop to less than the fasting level.

Epileptic Group:

The epileptic group of forty-five (45) patients was the next largest group. They revealed essentially the same type of glucose tolerance curve (Fig. III, Line C) as the psychoneurotic group.

Adenoma of Pancreas Group:

Three (3) proved cases of adenoma of the pancreas were encountered. All were relieved by operation. It is interesting that these three (3) cases were the only cases in the group of 212, except a pituitary dwarf and a case of myelogenous leukemia that had fasting blood sugars below 60 mgm. per cent. Their individual glucose tolerance curves are shown in Fig. IV, Lines A, B and C.

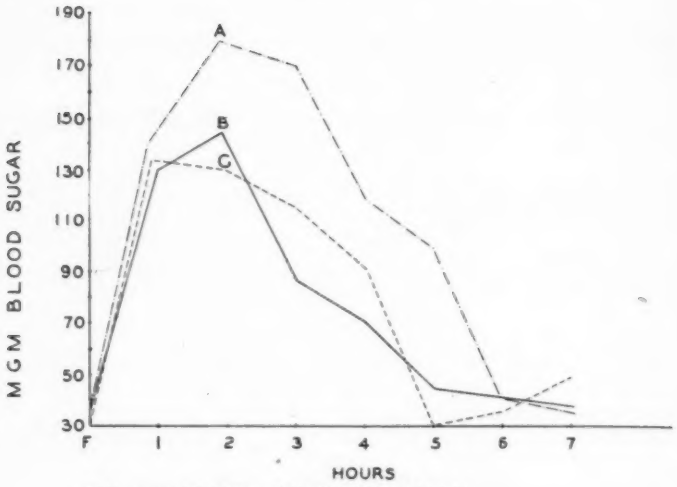

FIG. 4 GLUCOSE TOLERANCE CURVE
3 CASES ADENOMA OF THE PANCREAS

Miscellaneous Groups:

The remaining cases represent a variety of diagnoses. They are shown in Chart I with the diagnosis, number of cases, and average glucose tolerance curve where more than one case is present in a group.

Fourteen (14) cases of pregnancy (undelivered) in the last trimester were recorded. These cases all had revealed sugar in the urine on routine examination. A glucose tolerance was ordered to rule out diabetes mellitus. No symptoms of hypoglycemia were reported.

Six (6) cases of malnutrition in children and infants received glucose tolerance tests. These all were dietary problems with symptoms of loss of weight, dehydration and diarrhea.

Eight (8) cases with cardiovascular disease received glucose tolerance tests to rule out diabetes mellitus. These patients complained of weakness and loss of weight associated with hypertensive symptoms and decompensation.

Two (2) cases of renal glycosuria were noted. They were both asymptomatic.

The remaining cases are shown because they illustrate conditions which affect carbohydrate metabolism. It is interesting to note that they include cases with disturbances of function of the

liver, pituitary gland, and adrenal gland. The cases of sprue, celiac disease, leukemia, and Schüller Hand Christian's disease probably represent faulty carbohydrate metabolism from disfunction of the alimentary tract and starvation.

COMMENTS

In this review of two hundred and twelve (212) cases with abnormal glucose tolerance curves, a wide variety of functional and pathological conditions were encountered. However, it is representative of the group one would expect to find when considering the condition that would cause alterations in carbohydrate metabolism of a hypoglycemic nature.

The psychoneurotic group of patients is quite similar to that described by Portis.[8] Alexander and Portis[11] make a distinction between the psychoneurotic patient and the neurasthenic patient exhibiting the symptoms of fatigue, prostration, apathy, sleepiness, headache, palpitation, vertigo, anxiety, tremulousness, perspiration and vasomotor lability. This definition of the neurasthenic symptom complex closely resembles that in our group diagnosed psychoneurotic.

Portis, Alexander and Portis, Dyer[9] and Lieberman[10] have pointed out that neurasthenic fatigued patients show flat glucose tolerance curves which subsequently return to normal by the use of a diet low in carbohydrate and high in proteins.

Alexander and Portis[11] consider the flat glucose tolerance curve as evidence that the regulatory mechanism of alimentary glycemia is destroyed in the neurasthenic. They point out that these cases are not hypoglycemic individuals as the average fasting blood sugar level is normal. However, the symptoms which they exhibit are analogous with the hypoglycemic syndrome, because the neurasthenic is unable to raise the blood sugar level as required during activity, especially mental activity. This failure to increase the blood sugar is reflected in the metabolism of the brain, as the exclusive fuel of brain cells is glucose.

The neurasthenic or psychoneurotic seldom has severe hypoglycemic symptoms. Himwich[1] has classified the psychological sequelae of hypoglycemia into five (5) definite successive stages according to the metabolic rates in the various regions of the brain.

1. Cortical (sweating, salivation, muscular relaxation, tremor).
2. Subcortical-diencephalic (motor restlessness).
3. Mesencephalic (tonic spasm, Babinski reflex positive).
4. Premyencephalic (motor extensor spasm).
5. Myencephalic (coma).

In the majority of cases of functional hypoglycemia only the first phase is observed.

Portis[8] in fifteen (15) neurasthenic patients shows that the glucose tolerance test assumes a normal curve when atropine sulfate grains 1/100 to 1/50 is administered hypodermically before the test. This paralysis of the parasympathetic nervous system insures that emotional stimuli do not reach the pancreas to stimulate the secretion of insulin.

The effectiveness of the high protein, low carbohydrate diet is due to the slow rate at which dextrose is derived from proteins, resulting therefore in no elevation in blood sugar and consequently no secondary fall. The diet should contain about two (2) grams of protein per kilogram of body weight with from 50 to 75 grams of complex carbohydrate. Fats sufficient to maintain calories are given. No free sugar should be contained in the diet.

In addition to the above diet, Portis[8] recommends that these patients be given atropine sulfate 1/200 to 1/100 grains three (3) or four (4) times a day.

Rennie and Howard[12] have been able to accomplish similar results to those of Portis in these patients by psychiatric treatment directed to the underlying personality disorder. They infer that these patients have a psychoneurotic disturbance that produces the hypoglycemia. This classification of this group of cases seems logical.

The neurasthenic patient is notoriously a hyperactive individual. Minor stimuli may produce vasomotor or gastrointestinal symptoms through their effects on the autonomic nervous system.

Conn[13] states that this group of patients should be termed functional hypoglycemia. He states that they account for at least 70 per cent of all cases of spontaneous hypoglycemia.

Hypoglycemia usually produces the most disturbing symptoms in these cases. Fortunately these symptoms can be promptly relieved by the diet previously described provided the specified amount of protein is ingested. We have found belladonna and phenobarbital the sedatives of choice.

CONCLUSION

1. The blood sugar control mechanism that prevents hypoglycemia is intricate and complicated, and is subjected to disturbances by a number of diseases.
2. Two-hundred and twelve cases with abnormally low glucose tolerance curves are presented which illustrates the frequency of this condition.
3. It is adequately established that disorders of personality may affect carbohydrate metabolism.
4. Hypoglycemic states manifest themselves as simulating nervous and mental disorders, depending on the severity of the reaction.

5. Glucose tolerance studies should be performed on all cases in which the symptomology of neurasthenia is evident.
6. Treatment as outlined may be of help in removing the neurasthenic symptom complex.

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HAVE YOU TRIED

Solvoid as an adjuvant in dish washing? This may be purchased in most grocery stores. It is used as directed on the bottle.

Boon for removing dirt and grease on laboratory woodwork? This is also obtainable at the grocery store.

A *round curtain rod* attached vertically to a window frame for a ring stand?

A mixture of *Chlorox and Dreft* for removing serum from serology tubes?

Brillo pads for keeping copper and other metal test tube racks shining like new?

A *clothes pin,* spring type, for fastening pipettes to a request slip?

Chlorox, Purex, and other commercial hypochlorites for cleaning blood pipettes?

Chlorox for cleaning urinometer jars? Use full strength.

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Any other gadgets or household aids for making your work more efficient and easier?

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EDITORIAL

THE AMERICAN JOURNAL OF MEDICAL TECHNOLOGY is the official organ of the American Society of Medical Technologists. As such, its purposes are parallel to those stipulated in the Constitution adopted by our national House of Delegates, and in addition, it has the responsibility of being the instrument by which information is spread throughout the membership. Thus the member in an isolated area has equal opportunity with the members in metropolitan centers to know what is going on in his profession.

In printing the papers presented at annual conventions, the JOURNAL is the means through which its readers may have the benefit of the experience of both clinical and research workers. In this regard, it is the responsibility of program committees to choose convention material carefully and be sure that it is so organized that it will appear in print to as good effect as it does when read before an audience. There is also that material which may appear in the JOURNAL which is not read at convention. This includes brief articles covering techniques, suggestions which will improve laboratory methods, and even those very practical ideas which may be expressed in a single sentence by those who have found them useful. All these have a part in promoting higher standards in clinical laboratory methods and research.

In reporting the activities of committees and subordinate societies, the JOURNAL is of service to those groups organized and in the process of organizing which are the immediate instruments for elevating the status of the persons specializing in laboratory technique. It is only through such a banding together of persons practicing a profession that recognition as such can be gained. In those organized groups lies the responsibility of maintaining uniformly high standards.

While individuals and small groups can do much to create mutual understanding and cooperation between medical technologists and others who are employed in the interest of individual and public health, if such activity is maintained throughout a larger organization, and such efforts are coordinated, more success will be attendant thereon. The JOURNAL is the medium responsible for disseminating word of this activity.

The professional problems of individuals and the organizational problems of subordinate societies are not limited to single, isolated instances. They are widespread. The JOURNAL should be used as a medium to assist in the solution of these problems. The JOURNAL is not a static thing. It should grow and develop with the profession. It is the hope of the editorial staff that each successive volume will be of more value to its readers—medical technologists the world over.

R.M.

IN MEMORIAM

A.S.M.T. Members—1946-47

Paul R. Miller, 1548 Lee St., Charleston 1, West Virginia.

Eldred M. Berryman, 801 Power & Light Bldg., St. Petersburg, Florida.

Sr. M. Cherubine Castrop, Baraboo, Wisconsin.

Sr. Marie A. L'Ecuyer, Cambridge, Massachusetts.

Beatrice M. Bloomquist, Houston Texas.

Mrs. Gertrude F. Kerns, 421 Michigan St., Toledo, Ohio.

Frances E. Langdon, Colorado State Hospital, Pueblo, Colorado.

Olivia J. Thayer, Community Hospital, Boulder, Colorado.

Robert Jenkins, 707 Beaver Ave., Glenview, Illinois.

Florence Miesch, 6500 Irving Park, Chicago, Ill.

AMONG THE NEW BOOKS

ADVANCES IN INTERNAL MEDICINE, Volume II, edited by William Dock, M.D., Long Island College of Medicine, Brooklyn, N. Y., and I. Snapper, M.D., The Mount Sinai Hospital, New York, N. Y., 642 pages. New York: Interscience Publishers, Inc., 1947.

This volume covers the war period. Most of the contributions deal with problems met by surgeons and internists in civilian life. There are thirteen contributors covering a wide range of subjects, mostly on clinical medicine.

Two monographs are of special importance to those interested in laboratory medicine. These are "Problem of the Rhesus Antigen in Medicine", by Alexander S. Wiener, Brooklyn, N. Y., and "Pernicious Anemia and Other Megaloblastic Anemias", by L. S. P. Davidson, Edinburgh, and L. J. Davis, Glasgow, Scotland.

Dr. Wiener gives a splendid review of the Rh factor in its clinical applications as well as its medicolegal applications. A tremendous literature has accumulated on the Rh factor during the last five or six years, thus the stock taken by Dr. Wiener is very timely.

Stress is laid on the importance of preventing intra-group hemolytic transfusion reactions by the use of Rh-negative or other suitably selected donors. With this statement there will be no disagreement.

Probably less enthusiastically will be received by clinicians generally the suggestion of performing an exsanguination transfusion immediately after birth to prevent liver and brain damage. But this, after all, should be left to the expert.

Dr. Wiener's method of counterimmunization in Rh-negative women, who have sisters with erythroblastotic infants and who are themselves married to Rh-positive men, is interesting. For this purpose the author uses a triple typhoid vaccine and a pertussis vaccine in 1-10 dilution. These vaccines are given subcutaneously, and he cites one case where this method worked. "The vaccine does not affect the titer of antibodies already present in the serum, but may help to prevent their reappearance after they have disappeared."

The article by Drs. Davidson and Davis on "Pernicious Anemia and Other Megaloblastic Anemias" is excellent. Here, too, an extensive literature has accumulated which is reviewed by the authors.

Modern diagnostic methods are discussed, such as controlled therapeutic trial, bone marrow studies, refinements in methods of studying the peripheral blood, and biochemical methods.

Aside from pernicious, other anemias are discussed. These include anemia due to defective intake, defective absorption, defective storage, pregnancy and puerperium, and other causes.

Treatment is thoroughly discussed with liver, hogs' stomach, vitamines, hydrochloric acid, iron, blood transfusion, folic acid, etc.

The reviewer finds this a very readable book, offering an interesting and timely review of the subjects covered.

COLOR ATLAS OF HEMATOLOGY, by Roy R. Kracke, M.D., Dean and Professor of Clinical Medicine, Medical College of Alabama, Birmingham, Alabama. 197 pages, 32 plates in full color, 3 plates in black and white. Philadelphia, London, Montreal: J. B. Lippincott Company, 1947.

This book is one of practical value to every technologist who performs a blood count. It is the volume to which he will refer frequently while doing his "routine" work. It is a "working" reference. Concisely compiled, the "Definition of Hematologic Terms," which comprise the first chapter, will be a boon to the student who has been forced, heretofore, to read through numberless volumes to make such a list.

The color plates have been taken from Dr. Kracke's earlier work, "Diseases of the Blood." There is a chapter devoted to the origin and development of blood cells, cells in the bone marrow, as well as a brief description of the morphology of the cells. Each chapter is briefly written and is dominated by the splendid color plates which illustrate the types of cells described. The "normal" blood picture is given. Chapters 8 through 16, and Chapter 19, give descriptions and illustrations of various blood dyscrasias. These are placed into their respective categories as: Leukocytosis (Neutrocytosis, Lymphocytocis, etc.), the Leukopenic Diseases, the Iron-Deficiency Anemias, the Hemolytic Anemias, etc., as well as the types of Leukemias. The chapters on parasites, and on the Rh factor, complete the material on the blood picture. There is also a section on modern hematologic technic which will be of value to both the student and to the technologist who feels the need for review.

In the final chapter there is a summary of hematologic findings which will be invaluable. Altogether, this is a book from which the hematologist will derive as much benefit as will the "general technologist."

ABSTRACTS

I Bacteriology

SIMPLIFIED TECHNIQUES FOR INOCULATING CHICK EMBRYOS AND A MEANS OF AVOIDING EGG WHITE IN VACCINES. By W. I. B. Beveridge, Institut Pasteur, Paris. Science **106**; 324 (Oct. 3), 1947.

Chorioallantoic Inoculation:

"The eggs are candled, and the margin of the air space is marked on the shell in pencil on the side where the chorioallantois is best developed. The shell around this area is disinfected with 1/100 Zephiran or other suitable disinfectant. Using a pair of round, pointed forceps, a hole is made in the shell over the air space, a few millimeters from its margin. The shell is jabbed with the points of the forceps until it and the attached membrane are breached, and then the hole is carefully enlarged until it is roughly 1 cm long and 3-4 mm wide, running parallel with the margin of the air space. Next, the shell without the attached membrane is broken away for 3-4 mm beyond the margin of the air space—that is, over the chorioallantois. In doing this, care must be taken to lift the fragments of shell slowly outwards with the forceps and not to allow them to hinge back and pierce the chorioallantois. The exposed outer layer of shell membrane is then torn away, and the inner layer of shell membrane is found to have a fold about 1 mm wide marking the margin of the air space. A fine pair of forceps is used to tear the shell membrane along this fold. Up to this stage of the operation the egg is held in the left hand in an approximately horizontal position; it is now tilted with the air space downward.

"With 11-day embryos the chorioallantois usually falls readily, giving an artificial air space in the same position as the standard Burnet technique. With 12-day embryos it is usually necessary to tap the egg with the fingers to commence the separation of the chorioallantois from the shell membrane. When the separation commences the egg is returned to the horizontal position. The inoculum is placed on the chorioallantois with a Pasteur pipette, the hole in the shell sealed with cellophane adhesive tape, and the egg incubated in a horizontal position.

Amniotic inoculation:

"After preliminary incubation with the air-space end uppermost, in most of the eggs the embryo is found close to the margin of the air-space, which is essential with this technique. The eggs are candled and the hole commenced as for chorioallantois inoculation, but it is not extended beyond the margin of the air space. A sharp pointed pair of forceps is thrust through the shell membrane and chorioallantois, close to the margin of the air space,

and the hole thus made extended by blunt dissection to about 1 cm. As the air enters, the embryo enclosed in the amnion is presented at the hole. It may be necessary to remove some of the shell membrane adhering to the chorioallantois. Sometimes an air bubble blocks the hole; this may be disposed of by touching it with a needle heated in the flame. The amnion is grasped with forceps and inoculated with a Pasteur pipette drawn to a fine point and beveled, or with a syringe and needle. The egg is sealed with cellophane adhesive tape and returned to an upright position for incubation.

Allantois and Yolk Sac Inoculations:

"The hole is made in the shell with a surgical needle mounted by driving it through a rubber bung, after which the standard techniques are followed.

Position of the Egg During Incubation:

The author offers the following comments:

"After 4 days incubation the embryo often moves freely within the shell, rising immediately to the uppermost point as the egg is rotated.

"Between the 5th and 9th days movement is slower: If an egg lying horizontal is rotated 90°, the embryo and membranes rise to the top after several hours.

"Between the 10th and 12th days the position of the membranes becomes fixed, but the position of the embryo may still change to some extent if the egg is turned.

"If eggs incubated horizontally for 6-9 days are turned 180° so that the embryo and membranes are on the lower side, about 25% die overnight.

"Therefore, for the production of vaccines from allantoic fluid, yolk sac, or embryos, the eggs should be incubated before and after inoculation in a nearly vertical position with the air space upwards."

A CULTURE MEDIUM FOR THE PRIMARY ISOLATION OF FUNGI. By M. L. Littman, Department of Pathology and Bacteriology, Tulane University School of Medicine, New Orleans, Louisiana. Science 106:109 (Aug. 1), 1947.

Due to the fact that gram-positive and gram-negative bacteria grow luxuriantly and rapidly on Sabaraud's medium, thus making it difficult to isolate pathogenic fungi from specimens such as feces, sputum, or exudates and, also to the fact that many clinical specimens must be treated with 70 per cent alcohol or other agents to destroy surface bacteria if dermatophytes are to be successfully isolated, the author endeavored to produce a new medium which would eliminate these difficulties.

The completed medium contains in distilled water:
1% dextrose
1% peptone
1.5% oxgall
2% agar
(All elements are Bacto grade, Difco Laboratories, Detroit, Michigan.)
1/100,000 crystal violet*
30 units of streptomycin /cc of agar.

* "Crystal violet (indicator) dye content, 91%; National Aniline Division, 40 Rector Street, New York City. Stock Solution: 1.25 grams dissolved in 25 cc of 95% ethyl alcohol and kept in a tightly stoppered bottle. For use: 0.2 cc added/liter of medium."

"Oxgall-crystal violet agar was sterilized at 10-12 pounds pressure for 15 minutes (115-117.7° C.) and then cooled to approximately 46° C. Sufficient streptomycin sulphate in 5 cc of sterile saline was then added and well mixed, immediately prior to pouring, to provide a final concentration of 30 units of the antibiotic/cc agar." Heating in excess of the pressure and temperature quoted may cause an insoluble precipitate on the surface of the agar due to heat instability of the oxgall.

The author states that the new medium holds considerable promise as a diagnostic tool for the primary isolation of fungi from specimens possessing a mixed bacterial and fungal flora. He adds that it might also be employed (1) for an easier estimation of the normal fungal flora of feces, sputum, and other human discharges; (2) for a more accurate evaluation of human disorders of the upper and lower respiratory and gastro-intestinal tracts caused by fungi; (3) as a simpler method of single-cell isolation of fungi; (4) for an accurate quantitative estimation of viable saprophytic fungi in foodstuffs by plating techniques; (5) for an easier estimation of the fungal flora and content of the air; and (6) as a more rapid and proficient method for the examination of feces and sputum in incipient infections of the civil population with fungal agents of disease.

Addendum:

"It is our practice to distribute the medium in 500-cc quantities in 1-l. flasks, sterilize, and store in the refrigerator until needed, at which time the agar is remelted and cooled to approximately 46° C. Streptomycin in sterile saline is then added and mixed thoroughly, and the agar is poured, 27-30cc/plate. Plates of agar are left at room temperature 6-8 hours and then stored in the refrigerator. The poured agar appears transparent and light blue. In inoculating the medium, a generous quantity of sputum or fecal suspension in saline is vigorously spread over the surface of the agar using a sterile swab. Streaking by means of wire loop is not required. Skin and nail scraping and infected hairs are

planted directly on the surface of the agar without preliminary treatment. Plates are incubated at room temperature, preferably at 30° C., but not at 37° C."

II Parasitology

USE OF POLYVINYL ALCOHOL TO PRESERVE FECAL SMEARS FOR SUBSEQUENT STAINING. By Morris Goldman Laboratory Division, Communicable Disease Center, U. S. Public Health Service, Atlanta, Georgia. Science 106: 42 (July 11), 1947.

A method is described which makes it possible to submit trophozoite material in fixed smears on slides, to be stained and examined when received at a diagnostic laboratory. A fixative is employed which is embodied in water-soluble polyvinyl alcohol, which then serves the dual purpose of fixing the smear and forming a temporary mount during shipment.

The mounting medium is prepared "by dissolving, in a water bath, 20 grams of powdered Elvanol (specified as "Elvanol 90-25" formerly "polyvinyl alcohol, Grade RH-349-A, Type B, medium viscosity," obtainable from the E. I. du Pont de Nemours Co., Electrochemicals Department, Niagara Falls, New York) in the following solution: Saturated aqueous solution of mercuric chloride, 130 cc; 95% alcohol 60 cc; glacial acetic acid 50 cc; and phenol 50 cc." (Ed. Note: Concentration not given.)

Preparation of Smear for Shipment:

"A thin fecal smear is prepared on a clean slide in the usual manner. The smear should not be permitted to dry. It is then covered with a generous amount of the Elvanol solution, using a medicine dropper, and a cover slip applied. In 2-4 hours, the slide will be dry enough for mailing in any container in which the smears will not be subject to pressure.

Removal of Mounting Medium Prior to Staining:

"The slide is soaked in a 5% aqueous solution of glacial acetic acid at 60°-70° C. until all of the Elvanol film has been dissolved from the smear and the cover slip drops off. This usually takes about 15 minutes. The slide is then rinsed in tap water for 3 minutes and stained in the usual manner with iron-alum hematoxylin. Most organisms will stain as they do following ordinary fixation, except for a tendency to require longer destaining in the differentiating solution."

The author adds that preliminary experiments show that protozoan cysts and trophozoites as well as helminth eggs are well preserved by this method and that fecal smears prepared in this manner may be submitted to a laboratory with reasonable assurance that the intestinal parasites present will be recognizable following their staining with iron-alum and hematoxylin.

STANDING COMMITTEES

5000 Members and 48 State Societies in '48

(Membership Committee)

Two great tasks lie before the Membership Committee in this, the first year of its existence: promotion of national membership and organization of state societies.

The problem of increasing our national membership is one which requires the interest and cooperation of each and every member. Think how our total membership would soar if each of us secured one additional member for our organization. Yes, that is our goal—to double our membership in '48. And that is your responsibility this year—to carry forth our society to just one more technologist.

Each organized state should endeavor to increase its membership sufficiently to send at least one additional delegate to the national convention in St. Paul next summer. This means at least 25 more members in your state.

Which state society will be the first to have all its registered technologists members of the state and national societies? We would like to see several states attain this goal of 100 per cent membership by next summer.

Our second goal is a "state society in every state by '48". The membership committee stands ready to aid, suggest, and assist in any way it can. We have drawn up a suggested procedure for the formation of state societies. A list of registered technologists in your state is available from the A.S.M.T. Executive Office, Medical Center Bldg., Lafayette, Louisiana. Stamps, stationery, membership blanks, etc., may be requested through the membership committee. Sample and model Constitutions and By-Laws (the latter through the courtesy of the Constitution and By-Laws Committee) are also available through the membership committee. I shall be glad to assist personally in any way that I can, and I am sure that all members of the committee feel as I do. To facilitate our work, each member of the committee will concentrate her efforts on the territory geographically situated nearest her.

Any suggestions or criticisms you may have will be greatly appreciated. Let us all work together to make this year the biggest and best in the history of the American Society of Medical Technologists.

Jeanne Jorgenson, Chairman, 900 Modoc St., Berkeley 7, California
(3 year appointment) Territories and Foreign

Membership Committee (Cont'd)

Edna Luneke, 428 North College, Grand Rapids, Michigan, (3 year appointment). North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa Missouri, Wisconsin, Illinois, Indiana, Michigan, and Ohio.

Lucille Godelfer, 2928 Bell St., New Orleans, Louisiana, (2 year appointment). Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, Tennessee.

Ida Reilly, Roanoke Hospital Association, Roanoke, Virginia, (2 year appointment), North Carolina, South Carolina, Virginia, West Virginia, Kentucky, Maryland, Delaware, and District of Columbia.

Elizabeth Frey, 678 William St., Buffalo, New York, (1 year appointment). New York, Pennsylvania, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine.

Mary Wood, Yakima, Medical & Surgical Clinic, Yakima, Washington, (1 year appointment). Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Utah, Colorado, Arizona, and New Mexico.

CONSTITUTION AND BY-LAWS

The Constitution and By-Laws Committee now has ready a model form for the use of state and/or local groups to help them draft a Constitution and By-Laws. Those individuals or groups working toward organization of a state or other type of subordinate society and wishing to follow an accepted form may obtain the model from the A.S.M.T. Executive Office, Medical Center Bldg., Lafayette, Louisiana, or from Miss Jeanne Jorgenson, Chairman of the Membership Committee, 900 Modoc St., Berkeley 7, California. The model, with explanatory notes and recommendations, is made available through the Membership Committee as a matter of convenience to those working to organize a state or local society. Any question relating to Constitutions and By-Laws must be referred to Mr. L. B. Soucy, 805 West 8th St., Plainview, Texas. Legal matters regarding these subjects may likewise be referred to Mr. Soucy as the law firm serving the A.S.M.T. is at his immediate disposal.

Secretaries of all affiliated societies of the A.S.M.T. are requested to send a copy of the Constitution and By-Laws of their organization to this committee for study. The By-Laws of the A.S.M.T. now require that subordinate societies send to this committee any revised Constitution and or By-Laws one month after ratification. As most states will have to revise their Constitutions and By-Laws to conform with the amended document ratified at the 1947 meeting of the House of Delegates, it is hoped that the individual state committees will work in close cooperation with their national counterpart.

Individual members as well as state groups are urged to consider NOW any possible amendments to the Constitution and

By-Laws of the A.S.M.T. Any proposed changes in the Constitution must be submitted to the committee by January 1, 1948, in order that all members of the committee may consider the same. According to the Constitution, such proposed amendments "shall be submitted in writing to the Committee on Constitution and By-Laws, who shall submit the same to the Board of Directors with their opinion, and if such amendments are approved by a two-thirds vote of the Board of Directors, the Executive Secretary shall publish the same in the official organ at least sixty days prior to the next annual meeting of the House of Delegates." This means that the proposed amendments must be considered by the committee members, considered and voted upon by the Board of Directors, and sent to the Executive Secretary, who in turn, sends them to be published in the Journal, by February 15, the deadline for the March A.J.M.T., which would fulfill the requirements.

Proposed amendments to the By-Laws must also be presented by January 1, in order that the committee may "make such changes as necessary to provide proper form without a change in the meaning thereof and shall vote upon said proposal. If such proposition is approved by said Committee, it shall be submitted to the Executive Secretary for publication, and if disapproved, it shall be submitted to the Board of Directors and if approved by a majority vote of said Board, it shall then be submitted to the Executive Secretary for publication." This also, must be submitted by February 15 for publication in the March Journal.

This plea is not entered merely for the sake of encouraging amendments to the Constitution and By-Laws; but inasmuch as amendments are inevitable, the proposals should be submitted at an early date to assure the widest publicity possible. It is unfair to the members of the House of Delegates to burden them with proposals reflecting the views of a minority or proposals requiring lengthy discussions due to a lack of publicity. Before they are presented to the voting body, these proposed changes should be well aired. It is not the function, nor is it within the power, of the committee to reject proposals not meeting general approval. Only the House of Delegates may do this, and acceptance or rejection may be expedited in a well-informed House.

L. B. Soucy, 805 West 8th St., Plainview, Texas, Chairman
(3 year appointment)
Marjorie Copenharve, Minneapolis, Minnesota (3 year appointment)
Alice Daniel, Reno, Nevada (2 year appointment)
Katherine Dean, Baltimore, Maryland (2 year appointment)
Betty Hood, Fontana, California (1 year appointment)
Gladys Liles, Tulsa, Oklahoma (1 year appointment)

NOMINATIONS AND ELECTIONS COMMITTEE

The Nominations and Elections Committee wishes to call the attention of the members of the A.S.M.T. and associated societies to the officers to be elected at the next annual meeting of the House of Delegates. NOW is the time to voice your opinions as to whom you would like to have listed on the ballot for these offices. All suggestions will be given the close attention of the committee members. All suggestions must be received by the committee before January 1, 1948.

Persons selected must be members of the A.S.M.T. in good standing, and must have been members for at least two years. Please list names and addresses of those you would suggest, together with their qualifications for office.

Those holding office at the present time whose terms expire on June 30, 1948, are as follows:

President-elect: Rachel Lehman (takes office as president)
Recording Secretary: Ida Reilly (eligible for re-election)
Treasurer: (three year term) Loretta Laughlin (eligible for re-election)
Board of Directors: (three year term) Evelyn Jardine, Sr. M. Antonia Klapheke (filling term of Louis Herring resigned)

Please send communications at once to:

Henrietta M. Lyle, Maple Manor, R. D. #2, Columbia, Penn., Chairman (3 year appointment)
Gladys Jacobs, Bay City, Michigan (3 year appointment)
Eunice Reinhardt, Springfield, Illinois (2 year appointment)
Clara Kruse, Oakland, Iowa (2 year appointment)

STANDARDS AND STUDIES

The members of the Committee on Standards and Studies are sending a preliminary questionnaire to all A.M.A. approved hospitals, clinics, and doctors' offices known to employ medical technologists. These committee members are requesting the cooperation of all affiliated society members in seeing that these questionnaires are answered. They will be evaluated this year and will assist in enlightening us on the number of medical technologists registered, those non-registered, members of unions, salary range, educational background, as well as giving some idea of the future need for medical technologists. Comments and suggestions are requested from all A.S.M.T. members.

Mobile L. Hill, 2325 37th St., N.W., Washington 7, D. C., Chairman (3 year appointment)
Ethel A. Trenary, Madison, Wisconsin (3 year appointment)
Barbara Isbell, San Diego, California (2 year appointment)
Charlott Taw, Pittsburg, Pennsylvania (2 year appointment)
Doris E. Boon, Charleston, West Virginia (1 year appointment)
Sister M. Dolorosa (Pope), St. Louis, Missouri (1 year appointment)

RESEARCH COMMITTEE MEMBERS

Forrest W. Cross, Field Study Section—T.B. Control Division, U. S. Public Health Service, Bethesda 14, Maryland, Chairman (3 year appointment)
Hazel Suessenguth, Cleveland, Ohio (3 year appointment)
Elizabeth O'Toole, Denver, Colorado (2 year appointment)
Joyce Humphrey, St. Louis, Missouri (2 year appointment)
Dorothy Hitchcock, East Lansing, Michigan (1 year appointment)
Hartzell G. Payne, Terre Haute, Indiana (1 year appointment)

SERVICE FUND AND FINANCE COMMITTEE MEMBERS

Loretta Laughlin, 315 N. 11th St., Benson, Minnesota, Chairman (3 year appointment)
Bernice Elliott, Omaha, Nebraska (3 year appointment)
Mary Eichman, Philadelphia, Pennsylvania (2 year appointment)
Louise Vance Elmhurst, Illinois (2 year appointment)
Oscar Stewart, Tulsa, Oklahoma (1 year appointment)
Hermine Tate, Lafayette, Louisiana (1 year appointment)

LEGISLATION COMMITTEE

The membership is requested to be on the alert for legislation which will affect us as medical technologists and to notify the committee of such proposed bills whether they are being considered in state legislatures or in the national Congress.

Evelyn Jardine, Mary Hitchcock Hospital, Hanover, New Hampshire, Chairman (3 year appointment)
Vernal Johnson, Oklahoma City, Oklahoma (3 year appointment)
Vondell Stewart, Houston, Texas (2 year appointment)
Grace E. Marck, Salem Oregon (2 year appointment)
Violetta Wakefield, Ft. Smith, Arkansas (1 year appointment)
Sylvia Anderson, Wauwatosa, Wisconsin (1 year appointment)

EDUCATION COMMITTEE

In addition to continuing the other activities begun in the past few years, the Education Committee will again act as a clearing house for the paper writing contest. However, the policy will be somewhat changed as the direct responsibility for conducting the contests will be that of the state societies participating. The Education Committee will receive the prize-winning and Honorable Mention papers from the state contests and submit those eligible for the national awards to the Convention Program Committee. Those papers which are too brief to be read before a convention will be submitted to the Journal for possible publication.

The committee will be glad to assist the state organizations with information in regard to conducting the contests as well as contacting individuals seeking information. The A.S.M.T. has among its members many individuals well able to write excellent papers. Often one is so close to his own work that he

forgets he might be considered a specialist or that he might be working on a local problem that would prove valuable or interesting to those in other sections. The CUMULATIVE INDEX MEDICUS may be used to refer one to a wealth of knowledge. An author learns much as he reviews his bibliography. Perhaps he is performing a new technique in his laboratory. If this is successful and unique, it might be submitted for others to use.

State societies planning to conduct paper writing contests this year should plan their schedules to conform with that of the national Program Committee. Papers too brief to read before the national convention will not be eligible for the national awards, but a state society could consider them acceptable as contest material, and eligible for state awards. All state award papers should be submitted to the Education Committee chairman. She will forward those of suitable length and subject matter to the Program Committee for consideration. These papers must be in the hands of the Education Committee by March 1, 1948. This will necessitate the closing of state contests by February 15 at the latest. Papers should be submitted in quadruplicate, on 8½ x 11" paper. They should be double-spaced and have wide margins. References must be included. State societies planning to sponsor contests are requested to notify the chairman of the Education Committee promptly.

Rachel Lehman, 3939 N. Capitol, Indianapolis, Indiana, Chairman (1 year appointment)
Sister M. Antonia Klapheke, Washington, D. C. (3 year appointment)
Joy Holm, New Orleans, Louisiana (3 year appointment)
Rose Hackman, Denver, Colorado (2 year appointment)
Mary Pottner, Salt Lake City, Utah (2 year appointment)
Lucille Harris, Abilene, Texas (1 year appointment)

1948 CONVENTION PLANS

The sixteenth annual convention of the A.S.M.T. will be held in the Hotel St. Paul, St. Paul, Minnesota, on June 7, 8, and 9, 1948. Miss Frieda Claussen, 469 Laurel Avenue, St. Paul, is the Chairman of the Committee on Local Arrangements. The following are Chairmen of the convention committees:

1. Program: Sr. M. Alcuin, OSB, College of St. Scholastia, Duluth 2.
2. Technical Exhibits: Cecilia Korteum, 1164 N. Dearborn St., Chicago 10, Illinois.
3. Scientific Exhibits: Grace Mary Ederer, Northwestern Hospital, Minneapolis.
4. Entertainment: Loretta Laughlin, 315 N. 11th St., Benson.
5. Trip to Rochester: Elizabeth Maclay, 1141 9½ Ave., S.E., Rochester.
6. Symposium: Barbara Tucker, Northwestern Hospital, Minneapolis.
7. Registration and Credentials: Margaret Strane, Miller Hospital, St. Paul.
8. Reception: Patricia Bolger, Fargo Clinic, Fargo, North Dakota.
9. Sisters' Hospitality: Sr. Marcella Marie, CSJ, St. Joseph's Hospital, St. Paul.

10. Publicity: Mrs. Eileen Smith, 813 Kenwood Parkway, Minneapolis 11.
11. Speakers' Supplies: Mary Conroy, 865 Iglehart Ave., St. Paul 4.
12. Transportation: Frances Casey, 1466 Midway Parkway, St. Paul 4.
13. Signs: Kate Bradley, Apt. 305, 318 Harvard St., S.E., Minneapolis 14.
14. Awards: Grace Ballard, Milwaukee, Wisconsin.

Through the authorization of the Executive Committee and the various heads of the laboratory sections of the Mayo Clinic, Miss Elizabeth Maclay has extended the hospitality of the Clinic to the Convention. Tours of the Clinic are planned to be held concurrently with programs in the clinic. The Mayo Clinic Board of Governors has invited those attending the convention to be their guests at a luncheon and tea as a part of the program while in Rochester. Wednesday, June 9, has been reserved for this trip. A symposium on Hematology will follow the convention, on June 10 and 11. The committee chairmen are holding monthly meetings for the purpose of reporting upon the progress of their efforts and plans for the convention.

SCIENTIFIC EXHIBITS

Scientific exhibits will again be sponsored by the A.S.M.T. at the national convention in June, 1948. Medical Technology is progressing. Let us show our progress to our members and to our colleagues in related fields through the means of exhibits of our research and the application of that research in our laboratories.

Each state and local organization of medical technologists should accept the challenge of "Can We Show Progress?" With an affirmative reply, decide on your subject and at once make your plans to present an exhibit. Please address all communications in reference to these exhibits to:

Miss Grace Mary Ederer, Chairman
Scientific Exhibits Committee,
Northwestern Hospital,
Minneapolis, Minnesota.

PROGRAM COMMITTEE

The Program Committee invites each member of the A.S.M.T. to assist in making a scientific program by:

1. Notifying the Chairman that you are interested in presenting a paper. Please list the subject. These papers will be printed in the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY during the year following their presentation before the convention.

2. Listing subjects for papers and panels as suggestions for the program.

3. Submitting the names of others who could make significant contributions to the program.

4. Naming those persons who could possibly serve as modera-

tors in group discussions and listing the major services in medical technology which are their particular fields.

5. Naming individuals who deserve to be honored in some capacity on the program.

6. Expressing opinions as to whether 12-15 minute scientific papers followed by discussions will be satisfactory.

7. Encouraging your state society to sponsor a state paper writing contest by entering a paper in that contest (remember that papers entered in the state contests are eligible for presentation before the convention if they receive an award or honorable mention, or if the subject matter is suitable for a part on a panel discussion.

Sr. M. Alcuin, O.S.B.
College of St. Scholastica,
Duluth 2, Minnesota.

SYMPOSIUM

To Convention Delegates and Guests: Plan to remain in St. Paul following the A.S.M.T. Convention to attend the Symposium on Hematology. This will be held on Thursday and Friday, June 10 and 11, 1948, at the Continuation Center on the University of Minnesota campus.. Dr. William O'Brien will be the Director. Speakers and topics for the symposium will be announced.

Barbara Tucker, Chairman
Symposium Committee,
Northwestern Hospital,
Minneapolis, Minnesota.

SCHOLAR IN MEDICAL SCIENCE PROGRAM ANNOUNCED BY MARKLE FOUNDATION

$250,000 Annually Available for Five-year Post-fellowship Grants, Beginning 1948-49

An opportunity to start a career in academic medicine is offered to young scientists with the necessary training to hold a regular faculty appointment and to conduct original research through a new program of "post-fellowship" grants, announced by the John and Mary R. Markle Foundation. The purpose of the program, according to John M. Russel, Executive Director of the Foundation, is to attract much-needed talent to academic medicine by giving promising young scientists academic security and financial assistance for a period up to five years. The program will be conducted in cooperation with accredited medical schools in the United States and Canada. Grants of $25,000, payable to the cooperating school at the rate of $5,000 annually for a five-year period toward the support of each successful candidate or his research or both, will be available beginning with the academic year 1948-49. If the plan proves successful, the Foun-

dation will appropriate a total of $1,250,000 to the schools by 1953.

Candidates will be recommended by medical schools and will be limited to young men and women with a particularly strong interest in research and teaching in any of the clinical or preclinical sciences or in the sciences basic to medicine. They will have had training in some special field or combination of fields to qualify them to receive a regular faculty appointment and to conduct original research. The final choice will be made, on the basis of the schools' recommendations, by regional committees appointed by the Foundation. The young scientists chosen will be known as "Scholars in Medical Science." No fixed number of Scholars will be appointed in any year, but it is expected that approximately fifty will receive appointments during the five-year period. For each Scholar, the school will determine salary and academic rank, encourage research by setting reasonable limits upon teaching and other non-research activities, provide laboratory facilities, and, if necessary, make a financial contribution toward the support of his work.

The Scholar program places the emphasis on the personal qualities and scientific and teaching abilities of the men and women chosen, rather than upon particular research projects or teaching fields in which they may be interested. The program is the result of a survey of medical research and education, recently made by the Foundation, which shows that while there are scholarships and other forms of financial aid for the student in the course of his scientific training and while there are funds available to the scientist once his name is made, there are few sources of help at the beginning of the career of the man who chooses academic medicine.

A pamphlet covering the details of the plan has been sent to all deans of accredited medical schools, and persons interested in being considered as candidates are referred to them for further information.

REGULAR ARMY APPOINTMENTS OFFERED NURSES, PHYSICAL THERAPISTS, DIETITIANS AND OCCUPATIONAL THERAPISTS*

Recess appointments in the Regular Army were tendered recently by the President of the United States to 153 officers and former officers of the Army Nurse Corps, 31 Hospital Dietitians and 19 Physical Therapists. All had served as temporary officers and reserve officers during World War II.

In addition appointments were also tendered to three Occupational Therapists who have been serving as civilian employees in the Army Medical Department. This marks the first time that the Department of the Army has given commissioned officer status as Occupational Therapists.

These appointments, made as the result of an act of Congress establishing the Army Nurse Corps and the Women's Medical Specialist Corps as a part of the Regular Army, represent the first increment in this integration program. The Women's Medical Specialist Corps is composed of the Hospital Dietitian Section, the Physical Therapy Section and the Occupational Therapy Section.

The list of 31 Dietitians tendered appointments in the Women's Medical Specialist Corps includes the name of Major Helen C. Burns of Lowell, Mass., who has had continuous service in the Army Medical Department since 1928. During World War II Major Burns was director of Dietitians in the Army Medical Department and was awarded the Legion of Merit for outstanding performance of duty in this capacity.

The list of 19 officers tendered appointments in the Physical Therapy Section of the Women's Medical Specialist Corps includes the name of Major Emma E. Vogel, of 304 Nicolette Avenue, Mankato, Minnesota, who has had continuous service for the past 28 years with the Medical Department. During World War II Major Vogel was director of physical therapists in the Army Medical Department and was awarded the Legion of Merit for outstanding performance of duty in this capacity.

The deadline date for applications in the Army Nurse Corps and the Women's Medical Specialist Corps has been extended from September 30 to November 30, 1947.

* It seems that medical technologists are conspicuously absent.—Editor.

ANNOUNCEMENT OF COURSES IN THE LABORATORY DIAGNOSIS OF PARASITIC DISEASES

1. Three refresher courses for laboratory personnel in the Laboratory Diagnosis of Parasitic Diseases will be offered during 1948 by the Laboratory Division of the Communicable Disease Center. The inclusive dates for these classes are as follows:
January 12 - February 20 July 12 - August 20
October 11 - November 19

2. This training is open to all grades of employed laboratory personnel and although at the present time our first responsibility is to the laboratories of state and local public health departments, we are glad to consider applicants from hospitals and private laboratories when vacancies occur.

3. There is no tuition or laboratory fee but travel and living expenses must be paid for by the individual or his employer. Such expenses can be paid from Title VI funds.

4. Applications for all of the courses should be made as far in advance as possible. Notification of acceptance from this office will be made approximately two months before the course begins so that the states may have time to arrange budgetary allotments.

5. It is suggested that trainees obtain reservations for living accommodations at the earliest possible date. A list of hotels and rooming houses will be sent to applicants at the time of acceptance.

6. Laboratory directors and senior staff members wishing to attend any of the six-week courses may do so. However, it is proposed to schedule one or two short courses in the Laboratory Diagnosis of Parasitic Diseases for individuals in the above mentioned category. Definite dates for these two week classes have not been set, but it is requested that those interested notify us which of the following dates would be most suitable to them, giving first and second choice:

March 8-19, 1948; May 10-21, 1948; December 6-17, 1948.

R. F. Reider, Surgeon (R), Asst. Chief, Laboratory Division,
United States Public Health Service,
Communicable Disease Center, Laboratory Division,
291 Peachtree St., Atlanta, Ga.

Members of the A.S.M.T. are requested to review the new requirements for membership as listed in the Constitution and By-Laws adopted at the 1947 convention. This is summarized in the article in the July, 1947, A.J.M.T., page 199.

Mrs. Lucille Wallace, President of A.S.M.T., has recently moved from Bethesda, Maryland, to Bemidji, Minnesota. On Oct. 24 and 25, Mrs. Wallace, Miss Mary Eichman, and Miss Rachel Lehman attended the meeting of the Board of Registry in Chicago. A report of this meeting will be in your January JOURNAL.

STATE AND LOCAL SOCIETIES

ARKANSAS SOCIETY OF MEDICAL TECHNOLOGISTS

The Arkansas Society of Medical Technologists will hold its annual convention in Little Rock on Saturday, November 15, 1947. Present officers are as follows:

President: Mrs. Violetta Wakefield, 1209 North 34th St., Ft. Smith.
Vice-president: Mr. H. C. Dyer.
Secretary-Treasurer: Lila Church, 2116 Orange St., North Little Rock.
Board of Directors: Harriet Cypret, Florida Casey.

DISTRICT OF COLUMBIA SOCIETY OF MEDICAL TECHNOLOGISTS

President: Mrs. Grace Wagner, 110 S. Pitt St., Alexandria, Virginia.
President-elect: Mary Ellen Hunter, Hunter Laboratories, Washington, D. C.
Corresponding Secretary: Katherine C. Hilliard, 1004 Flower Ave., Takoma Park, Maryland.

OHIO SOCIETY OF MEDICAL TECHNOLOGISTS

President: Wilbert Zimmer, Grant Hospital, Columbus 15.
Vice-president: Sr. Eugene Marie (Carpe), Good Samaritan Hospital, Cincinnati 2.
Secretary: Mary Lewis, 151 Storer Ave., Akron 2.
Treasurer: Anne B. Maddocks, 1550 E. Broad, Columbus 3.

PENNSYLVANIA SOCIETY OF MEDICAL TECHNOLOGISTS AND LABORATORY TECHNICIANS

The Pennsylvania Society of Medical Technologists and Laboratory Technicians held a Seminar on November 8, 1947, with the following program: "Practical Aids in the Clinical Mycology Laboratory," by Forrest W. Cross, MT (ASCP); "Functional Diagnosis," by Abraham Cantarow, M.D.; "Laboratory Diagnosis of the More Important Intestinal Parasites," by Edwin S. Gault, M.D.; "Tissue Technique," Raymond Crane, M.D.; "Discussion of Organizational Problems," led by Mary Eichman, MT (ASCP); "Chemotherapy of Leukemia, Lymphomas, and Allied Diseases," by Alton D. Blake, M.D. Medical Technologists from the adjoining states of New York, New Jersey, and Delaware were invited.

Lists of officers in subsequent issues of the Journal supersede all previous lists. If lists are not complete or if addresses are not given, it is because we do not have the information in our possession. Please send corrected lists of officers with their addresses, together with reports of conventions as soon as such are available. Notice of conventions will be given in the journal if we have the information. This is one means of contacting members of the A.S.M.T. who have recently moved into your state, and who have not otherwise contacted your organization.

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Laboratory Technician—Complete charge of laboratory, 40-bed community hospital, small town 30 miles inland from Santa Barbara, California; $325-$350. House or apartment assured.

Laboratory Technician—Clinic located in famed desert winter resort; salary $250 a month, six weeks' paid vacation each summer.

Laboratory Technician—Small well equipped private hospital on ocean, resort town near San Diego, California; $200.

Laboratory Technician—For 100-bed Catholic hospital, inland California northeast of Los Angeles; $300. This community has a population of 85,000 and is on direct line between Los Angeles and San Francisco. Laboratory has several technicians who alternate call.

Laboratory Technician—Southern California near Mexican border. Two positions open, one inland and the other on coast; both excellent connections. Salaries, each $300.

Laboratory Technician—One of California's finest hospital laboratories located noted summer and winter seaside resort city; all usual procedures and some research in bacteriology; $200 and percentage.

Laboratory Technician—Busy laboratory operated by doctor who also has small hospital; one of the Valley towns in California; all laboratory procedures with some emphasis on blood chemistry; $300 with excellent increases for satisfactory service.

Laboratory Technician—Well-known hospital in San Francisco area; will consider beginner with good background; salary open.

Business and Medical Registry

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ELSIE MILLER, Director

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